Multi-Scale Pathways in the Ocean

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Abstract

The ocean displays energetic dynamics across a wide range of spatial scales, and researchers have long worked to better understand the coupling between these various scales. While quantification of such scale interactions has been previously attempted as part of an effort to understand energy pathways, assumptions of homogeneity and isotropy have presented a limitation upon the applicability of the analyses.

We present a more general technique to the quantification of energy transfer between scales, unrestricted by the usual assumptions of homogeneity or isotropy, which allows one to simultaneously probe the dynamics in both space and time. The technique we apply makes use of a novel coarse-graining framework to directly analyze the coupling between scales. We apply this technique with care to consider the spherical geometry of the problem. I will show example applications using both satellite measurements and model data.